

**LPC# 009 065 0003 - Madison County**  
**Magnesium Elektron - Madison**  
**ILN000510839**  
**Confidential**

# **Preliminary Assessment Quickscore**



**Prepared by:**  
**Office of Site Evaluation**  
**Division of Remediation Management**  
**Bureau of Land**

## Executive Summary

Based on the sources reviewed, the site was originally developed as early as 1942 by the General Steel Casting Armor Plant and the Defense Plant Corporation for the production of tank turrets. Following the end of World War II, the Standard Steel Spring Company, George A. Fuller Company, and Defense Plant Corporation jointly operated the casting facility until the late 1940s. At this time, steel casting activities were abandoned and the plant remained vacant until its acquisition by the Dow Chemical Company. At this time, steel casting activities were abandoned and the plant remained vacant until its acquisition by the Dow Chemical Company. Dow Chemical Company owned the facility in the early 1950s and began the current magnesium and aluminum manufacturing operations in approximately 1954. During this time, uranium metal rods were extruded and straightened at the facility. Dow operated the facility until 1969 at which time it leased the facility to Phelps Dodge Corporation. Phelps Dodge Corporation subsequently formed a partnership with Alusuisse, purchased the facility, and continued operations as the Consolidated Aluminum Company. In 1986, Spectrulite purchased the facility. Spectrulite used the facility to cast magnesium and thorium. Magnesium Elektron became the property holder in 2013; it supplies magnesium alloys, powders, and product. Contaminants of concern include Uranium 234, PCBs, manganese and mercury.

On December 11, 1989, Spectrulite informed the agency of a gasoline release when two tanks were removed from the ground. Over the course of 20 years, six other tanks were removed. They had reportedly contained: gasoline, kerosene, turpentine, used oil, cutting oil, motor oil, and heating oil. These tanks were removed and the soil and groundwater sampled and remediated with Illinois EPA oversight. A No Further Remediation letter was issued on June 17, 2010.

In 1989, the U.S. Army Corps of Engineers (USACE) found low concentrations of residual uranium contamination in two onsite buildings in the overhead structures. In 1992, the site was added to the US Army Corp of Engineers, Formerly Utilized Sites Remedial Action Program (FUSRAP). DOE completed a comprehensive clean-up of all contaminated dust. This is documented in both a letter from the Department of the Army to Spectrulite (2000) certifying completion of remedial activities, as well as the "Post-Remedial Action Report for the Madison FUSRAP" prepared by the US Army Corps of Engineers, dated September 2000. In the 2002, the site was removed from the FUSRAP and transferred to the Department of Energy.

Spectrulite contractor PANGAEA Corp. performed comprehensive surveys of remaining rafters, the dross storage area, drains and outside surfaces in 2004. In 2006, initial decommissioning efforts generated 705 tons of thorium waste that was shipped for disposal at Envirocare of Utah. Secondary decommissioning activities were completed generating an additional 219 tons of thorium waste. In May of 2007, Illinois Emergency Management Agency's (IEMA) Division of Nuclear Safety performed post remedial verification surveys concurrently with on-site decommissioning activities. Areas covered included the dross storage area, rafters and exterior soil contamination. Spectrulite was required to comply with IEMA surface release limits. Radiological conditions at the site met applicable release limits. Final report was delivered in February 2008.

On October 4, 2010, Magnesium Elektron experienced an explosion and a fire at their facility. Magnesium oxide particles were dispersed into the air. The events started by one of the coil reheating furnaces. A water line ruptured and the water came into contact with molten magnesium furthering the events. The facility was inspected by IEPA Bureau of Air and Office of Emergency Response. Samples were negative for asbestos. The site was recommended to the State of Illinois Attorney General's Office for violations. There is no indication that this enforcement action was pursued.

The site is currently under regulations from the RCRA program and the Illinois EPA's Bureau of Air. The date of the last RCRA inspection was 2009. Magnesium Elektron is currently operating under a Bureau of Air permit.

The groundwater pathway is not considered a viable pathway for exposure at this time. Information exists that current drinking water is obtained from the Illinois American Water Company which utilizes the Mississippi River. Groundwater wells were installed in correlation to a UST removal at the site. Illinois EPA issued a Comprehensive No Further Remediation Letter in response to the UST removal. Storm water at the site discharges into storm drains located site-wide. This drainage is treated at the Granite City Sewer Treatment facility. The groundwater pathway is amplified by the number of people living in the surrounding area are counted as potential targets. At this time, there is no indication that these individuals are utilizing any of the groundwater for any purposes.

The surface water pathway is not a viable pathway of exposure due to the runoff of water is directed to the Granite City Sewer Treatment facility by the storm drains located on site. There are no wetlands or waterbodies nearby that may be impacted by surface water.

Soil exposure is expected to be low due the past remedial activities that have occurred at the site. The site is active and is surrounded by a maintained fence with a gated entrance with a guard station. The site consists of approximately 1,400,000 square feet of indoor manufacturing floor space, centrally located on the property, which includes raw material storage, casting, extrusion, rolling, finishing, maintenance, laboratory, and office operations. The facility employs approximately 100 people. The area north of the building complex is a mixture of asphalt-paved, gravel, rail-spurs and over-grown land. Asphalt paving also extends along the western edge of the building with the remnants of a former propane tank farm beyond. A plant roadway adjoins the eastern edge of the production facility along with one of the facility's cooling towers. The plant office and laboratory building, as well as an employee parking lot, are located on the property's southern boundary. Unimproved areas on site are covered with grass and/or over-grown vegetation.

Magnesium Elektron is currently being permitted through the IEPA Bureau of Air.

The Magnesium Elektron facility has been investigated by the IEPA BOA as recently as March 7, 2013, where it was found to be in violation of allowing the present coatings exceeds the allowable limits in the regulations for extreme performance coatings. An enforcement action through the Illinois Attorney General's Office was filed in Madison County Illinois in September 2014. Past operations at the facility may have allowed magnesium, uranium, and thorium to become airborne and travel outside the facility. Sampling of the buildings and exits near the production area of the radioactive materials identified low levels of radiation which were remediated as documented in the Post-Remedial Action Report for the Madison FUSRAP, September 2000.

Using the information gathered during the Preliminary Assessment, an evaluation of the Magnesium Elektron site generated a site score of 25.12. The majority of the points accumulated for the score are from the Groundwater pathway. Remedial activities which have occurred at the facility have rectified any radioactive contamination which had been present at the facility. Ongoing inspections by RCRA and current permits achieved through Illinois EPA's Bureau of Land have minimized the potential for future contamination to occur. **Non - Responsive**

**\*\*\*\* CONFIDENTIAL \*\*\*\***  
**\*\*\*\*PRE-DECISIONAL DOCUMENT \*\*\*\***  
**\*\*\*\* SUMMARY SCORESHEET \*\*\*\***  
**\*\*\*\* FOR COMPUTING PROJECTED HRS SCORE \*\*\*\***

**\*\*\*\* Do Not Cite or Quote \*\*\*\***

Site Name: Magnesium Elektron                      Region: Region 5  
 Scenario Name: Preliminary Assessment  
 City, County, State:     , Illinois                      Evaluator: Lance Range  
 EPA ID#:    Date:  
 Lat/Long: 0:0:0,0:0:0  
 Congressional District:  
 This Scoresheet is for: SI  
 Scenario Name: Preliminary Assessment  
 Description:

	S pathway	S <sup>2</sup> pathway
Ground Water Migration Pathway Score (S <sub>gw</sub> )	1.12	1.25
Surface Water Migration Pathway Score (S <sub>sw</sub> )	2.4	5.76
Soil Exposure Pathway Score (S <sub>s</sub> )	1.8	3.24
Air Migration Score (S <sub>a</sub> )	10.17	103.43
$S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		113.68
$(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)/4$		28.42
$/(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)/4$		5.33

Pathways not assigned a score (explain):

**TABLE 3-1 --GROUND WATER MIGRATION PATHWAY SCORESHEET**

Factor categories and factors	Maximum Value	Value Assigned
Aquifer Evaluated: Shallow		
<b>Likelihood of Release to an Aquifer:</b>		
1. Observed Release	550	0.0
2. Potential to Release:		
2a. Containment	10	10.0
2b. Net Precipitation	10	6.0
2c. Depth to Aquifer	5	5.0
2d. Travel Time	35	35.0
2e. Potential to Release [(lines 2a(2b + 2c + 2d)]	500	460.0
3. Likelihood of Release (higher of lines 1 and 2e)	550	460.0
<b>Waste Characteristics:</b>		
4. Toxicity/Mobility	(a)	2000.0
5. Hazardous Waste Quantity	(a)	10.0
6. Waste Characteristics	100	10.0
<b>Targets:</b>		
7. Nearest Well	(b)	20.0
8. Population:		
8a. Level I Concentrations	(b)	0.0
8b. Level II Concentrations	(b)	0.0
8c. Potential Contamination	(b)	0.0
8d. Population (lines 8a + 8b + 8c)	(b)	0.0
9. Resources	5	0.0
10. Wellhead Protection Area	20	0.0
11. Targets (lines 7 + 8d + 9 + 10)	(b)	20.0
<b>Ground Water Migration Score for an Aquifer:</b>		
12. Aquifer Score [(lines 3 x 6 x 11)/82,5000] <sup>c</sup>	100	1.12
<b>Ground Water Migration Pathway Score:</b>		
13. Pathway Score ( $S_{gw}$ ), (highest value from line 12 for all aquifers evaluated) <sup>c</sup>	100	1.12

<sup>a</sup> Maximum value applies to waste characteristics category

<sup>b</sup> Maximum value not applicable

<sup>c</sup> Do not round to nearest integer

**TABLE 4-1 --SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET**

Factor categories and factors	Maximum Value	Value Assigned
Watershed Evaluated: Surface Water		
<b>Drinking Water Threat</b>		
<b>Likelihood of Release:</b>		
1. Observed Release	550	550.0
2. Potential to Release by Overland Flow:		
2a. Containment	10	10.0
2b. Runoff	10	0.0
2c. Distance to Surface Water	5	16.0
2d. Potential to Release by Overland Flow [(lines 2a(2b + 2c)]	35	160.0
3. Potential to Release by Flood:		
3a. Containment (Flood)	10	10.0
3b. Flood Frequency	50	0.0
3c. Potential to Release by Flood (lines 3a x 3b)	500	0.0
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	160.0
5. Likelihood of Release (higher of lines 1 and 4)	550	550.0
<b>Waste Characteristics:</b>		
6. Toxicity/Persistence	(a)	10000.0
7. Hazardous Waste Quantity	(a)	10.0
8. Waste Characteristics	100	18.0
<b>Targets:</b>		
9. Nearest Intake	50	0.0
10. Population:		
10a. Level I Concentrations	(b)	0.0
10b. Level II Concentrations	(b)	0.0
10c. Potential Contamination	(b)	0.0
10d. Population (lines 10a + 10b + 10c)	(b)	0.0
11. Resources	5	0.0
12. Targets (lines 9 + 10d + 11)	(b)	0.0
<b>Drinking Water Threat Score:</b>		
13. Drinking Water Threat Score [(lines 5x8x12)/82,500, subject to a max of 100]	100	0.0
<b>Human Food Chain Threat</b>		
<b>Likelihood of Release:</b>		
14. Likelihood of Release (same value as line 5)	550	550.0
<b>Waste Characteristics:</b>		
15. Toxicity/Persistence/Bioaccumulation	(a)	5.0E8
16. Hazardous Waste Quantity	(a)	10.0
17. Waste Characteristics	1000	180.0
<b>Targets:</b>		
18. Food Chain Individual	50	2.0
19. Population		
19a. Level I Concentration	(b)	0.0
19b. Level II Concentration	(b)	0.0
19c. Potential Human Food Chain Contamination	(b)	0.0
19d. Population (lines 19a + 19b + 19c)	(b)	0.0
20. Targets (lines 18 + 19d)	(b)	2.0
<b>Human Food Chain Threat Score:</b>		
21. Human Food Chain Threat Score [(lines 14x17x20)/82500, subject to max of 100]	100	2.4
<b>Environmental Threat</b>		
<b>Likelihood of Release:</b>		
22. Likelihood of Release (same value as line 5)	550	550.0
<b>Waste Characteristics:</b>		
23. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	5.0E8
24. Hazardous Waste Quantity	(a)	10.0
25. Waste Characteristics	1000	180.0

**Targets:**

26. Sensitive Environments		
26a. Level I Concentrations	(b)	0.0
26b. Level II Concentrations	(b)	0.0
26c. Potential Contamination	(b)	0.0
26d. Sensitive Environments (lines 26a + 26b + 26c)	(b)	0.0
27. Targets (value from line 26d)	(b)	0.0

**Environmental Threat Score:**

28. Environmental Threat Score [(lines 22x25x27)/82,500 subject to a max of 60]	60	0.0
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**Surface Water Overland/Flood Migration Component Score for a Watershed**

29. Watershed Score <sup>c</sup> (lines 13+21+28, subject to a max of 100)	100	2.40
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**Surface Water Overland/Flood Migration Component Score**

30. Component Score ( $S_{sw}$ ) <sup>c</sup> (highest score from line 29 for all watersheds evaluated)	100	2.40
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<sup>a</sup> Maximum value applies to waste characteristics category

<sup>b</sup> Maximum value not applicable

<sup>c</sup> Do not round to nearest integer

**TABLE 4-25 --GROUND WATER TO SURFACE WATER MIGRATION COMPONENT SCORESHEET**

Factor categories and factors	Maximum Value	Value Assigned
Watershed Evaluated: Surface Water		
<b>Drinking Water Threat</b>		
<b>Likelihood of Release to an Aquifer:</b>		
1. Observed Release	550	0.0
2. Potential to Release:		
2a. Containment	10	0.0
2b. Net Precipitation	10	0.0
2c. Depth to Aquifer	5	0.0
2d. Travel Time	35	0.0
2e. Potential to Release [(lines 2a(2b + 2c + 2d)]	500	0.0
3. Likelihood of Release (higher of lines 1 and 2e)	550	0.0
<b>Waste Characteristics:</b>		
4. Toxicity/Mobility	(a)	0.0
5. Hazardous Waste Quantity	(a)	0.0
6. Waste Characteristics	100	0.0
<b>Targets:</b>		
7. Nearest Well	(b)	0.0
8. Population:		
8a. Level I Concentrations	(b)	0.0
8b. Level II Concentrations	(b)	0.0
8c. Potential Contamination	(b)	0.0
8d. Population (lines 8a + 8b + 8c)	(b)	0.0
9. Resources	5	0.0
10. Targets (lines 7 + 8d + 9)	(b)	0.0
<b>Drinking Water Threat Score:</b>		
11. Drinking Water Threat Score [(lines 3 x 6 x 10)/82,500, subject to max of 100]	100	0.0
<b>Human Food Chain Threat</b>		
<b>Likelihood of Release:</b>		
12. Likelihood of Release (same value as line 3)	550	0.0
<b>Waste Characteristics:</b>		
13. Toxicity/Mobility/Persistence/Bioaccumulation	(a)	0.0
14. Hazardous Waste Quantity	(a)	0.0
15. Waste Characteristics	1000	0.0
<b>Targets:</b>		
16. Food Chain Individual	50	0.0
17. Population		
17a. Level I Concentration	(b)	0.0
17b. Level II Concentration	(b)	0.0
17c. Potential Human Food Chain Contamination	(b)	0.0
17d. Population (lines 17a + 17b + 17c)	(b)	0.0
18. Targets (lines 16 + 17d)	(b)	0.0
<b>Human Food Chain Threat Score:</b>		
19. Human Food Chain Threat Score [(lines 12x15x18)/82,500,subject to max of 100]	100	0.0
<b>Environmental Threat</b>		
<b>Likelihood of Release:</b>		
20. Likelihood of Release (same value as line 3)	550	0.0
<b>Waste Characteristics:</b>		
21. Ecosystem Toxicity/Persistence/Bioaccumulation	(a)	0.0
22. Hazardous Waste Quantity	(a)	0.0
23. Waste Characteristics	1000	0.0
<b>Targets:</b>		
24. Sensitive Environments		
24a. Level I Concentrations	(b)	0.0
24b. Level II Concentrations	(b)	0.0



24c. Potential Contamination	(b)	0.0	
24d. Sensitive Environments (lines 24a + 24b + 24c)	(b)	0.0	
25. Targets (value from line 24d)	(b)		0.0
<b>Environmental Threat Score:</b>			
26. Environmental Threat Score [(lines 20x23x25)/82,500 subject to a max of 60]	60		0.0
<b>Ground Water to Surface Water Migration Component Score for a Watershed</b>			
27. Watershed Score <sup>c</sup> (lines 11 + 19 + 28, subject to a max of 100)	100		0.0
28. Component Score (S <sub>gs</sub> ) <sup>c</sup> (highest score from line 27 for all watersheds evaluated, subject to a max of 100)	100		0.0

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<sup>a</sup> Maximum value applies to waste characteristics category

<sup>b</sup> Maximum value not applicable

<sup>c</sup> Do not round to nearest integer

**TABLE 5-1 --SOIL EXPOSURE PATHWAY SCORESHEET**

Factor categories and factors	Maximum Value	Value Assigned
<b>Likelihood of Exposure:</b>		
1. Likelihood of Exposure	550	550.0
<b>Waste Characteristics:</b>		
2. Toxicity	(a)	10000.0
3. Hazardous Waste Quantity	(a)	10.0
4. Waste Characteristics	100	18.0
<b>Targets:</b>		
5. Resident Individual	50	0.0
6. Resident Population:		
6a. Level I Concentrations	(b)	0
6b. Level II Concentrations	(b)	
6c. Population (lines 6a + 6b)	(b)	
7. Workers	15	15.0
8. Resources	5	
9. Terrestrial Sensitive Environments	(c)	
10. Targets (lines 5 + 6c + 7 + 8 + 9)	(b)	15.0
<b>Resident Population Threat Score</b>		
11. Resident Population Threat Score (lines 1 x 4 x 10)	(b)	148500.0
<b>Nearby Population Threat</b>		
<b>Likelihood of Exposure:</b>		
12. Attractiveness/Accessibility	100	5.0
13. Area of Contamination	100	5.0
14. Likelihood of Exposure	500	5.0
<b>Waste Characteristics:</b>		
15. Toxicity	(a)	10000.0
16. Hazardous Waste Quantity	(a)	10.0
17. Waste Characteristics	100	18.0
<b>Targets:</b>		
18. Nearby Individual	1	1.0
19. Population Within 1 Mile	(b)	3.0
20. Targets (lines 18 + 19)	(b)	4.0
<b>Nearby Population Threat Score</b>		
21. Nearby Population Threat (lines 14 x 17 x 20)	(b)	360.0
<b>Soil Exposure Pathway Score:</b>		
22. Pathway Score <sup>d</sup> (S <sub>s</sub> ), [(lines (11+21)/82,500, subject to max of 100]	100	1.8

<sup>a</sup> Maximum value applies to waste characteristics category

<sup>b</sup> Maximum value not applicable

<sup>c</sup> No specific maximum value applies to factor. However, pathway score based solely on terrestrial sensitive environments is limited to a maximum of 60

<sup>d</sup> Do not round to nearest integer

**TABLE 6-1 --AIR MIGRATION PATHWAY SCORESHEET**

Factor categories and factors	Maximum Value	Value Assigned
<b>Likelihood of Release:</b>		
1. Observed Release	550	550.0
2. Potential to Release:		
2a. Gas Potential to Release	500	0.0
2b. Particulate Potential to Release	500	175.0
2c. Potential to Release (higher of lines 2a and 2b)	500	175.0
3. Likelihood of Release (higher of lines 1 and 2c)	550	550.0
<b>Waste Characteristics:</b>		
4. Toxicity/Mobility	(a)	200.0
5. Hazardous Waste Quantity	(a)	100.0
6. Waste Characteristics	100	10.0
<b>Targets:</b>		
7. Nearest Individual	50	50.0
8. Population:		
8a. Level I Concentrations	(b)	0.0
8b. Level II Concentrations	(b)	0.0
8c. Potential Contamination	(c)	50.0
8d. Population (lines 8a + 8b + 8c)	(b)	50.0
9. Resources	5	0.0
10. Sensitive Environments:		
10a. Actual Contamination	(c)	0.0
10b. Potential Contamination	(c)	52.5
10c. Sensitive Environments (lines 10a + 10b)	(c)	52.5
11. Targets (lines 7 + 8d + 9 + 10c)	(b)	152.5
<b>Air Migration Pathway Score:</b>		
12. Pathway Score (S <sub>a</sub> ) [(lines 3 x 6 x 11)/82,500] <sup>d</sup>	100	10.17

<sup>a</sup> Maximum value applies to waste characteristics category

<sup>b</sup> Maximum value not applicable

<sup>c</sup> No specific maximum value applies to factor. However, pathway score based solely on sensitive environments is limited to a maximum of 60.

<sup>d</sup> Do not round to nearest integer